

NASA Symposium: Risk and Exploration

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Moderator: In the words of my good friend from Texas, General Jefferson Howell, it's good to be alive and in California.

[Laughter]

Good morning. It's good to see so many colleagues and friends here in beautiful Monterey at the prestigious Naval Postgraduate School. Established in 1951, the Postgraduate School houses state of the art laboratories, numerous academic buildings, a library, government housing, and impressive recreational facilities. There are around 1500 students here, and each class is taught by a highly talented member of the faculty made up of an impressive collection of scholars. Nearly all hold doctorate degrees. So, it is on that foundation of education, excellence, and diversity that we meet here to talk about risk and exploration.

As we continue to make progress in our important work to return the space shuttles to safe flight, there is an ongoing discussion about risk and whether or not the human exploration of space is an essential part of our future. Each of us understands that human space exploration is indeed a risky endeavor; however, the quest for discovery and knowledge and the risk involved while pursuing these important endeavors are not unique to NASA. That's why we're here this week: to engage in a discussion, a debate, an exploration if you will, about exploration and risk.

Let's begin with someone who knows a little bit about both subjects. Scott Hubbard is Director of NASA's Ames Research Center in the heart of nearby Silicon Valley. In 2003, he served as NASA's representative on the Columbia Accident Investigation Board and directed the impact testing analysis that established the definitive physical cause of that tragedy. He has also served as the first Mars Program Director for the agency. Please join me in welcoming Scott Hubbard.

[Applause]

Scott Hubbard: Thank you. Thank you and good morning. On behalf of Ames Research Center, one of your local hosts, I bid you greetings: to the Administrator, to my fellow Center Directors, distinguished guests from Headquarters, members of the NASA family. Our thoughts go out today to members of the Kennedy Space Center who cannot be here with us. They are attending to the damage from the hurricanes that have hit them recently. Greetings also to the rest of the distinguished guests here, and, of course, to our gracious hosts at the Naval Postgraduate School.

We are here today to look at risk. How do we perceive risk, real and otherwise? How do we identify risk? How do we mitigate risk? And finally, when and how should we tolerate and accept risk? And all of this discussion, of course, is in the context of exploration, the essence of what we do.

What is risk? In our daily lives, we all assume multiple levels of real risk. We get into cars. We get into airplanes, some of us far too often. We cross roads. We use cell phones while we're driving. [Laughter] We eat bacon and barbecued chicken that contain potentially carcinogenic nitrites. One way or another, all these things represent real risks that we tolerate and accept. Most of us mitigate these risks in some measure by doing things like wearing seatbelts, using the oversight of agencies like the FAA, remembering to look both ways, and getting our annual physical checkups. We are accustomed to living with risk, whether we realize it or not.

Today, tomorrow, and Wednesday morning, we are going to explore risk in the field of exploration. There is monetary risk, programmatic risk, and, of course, the far more compelling issue of risk to life and limb of the explorers. We look at how we decide what risks are acceptable, both for the individual and the institution. I think this is a key element here. How do people perceive risk individually? How do we perceive risk as institutions? How do we collectively decide what we will accept?

Let me give you a little bit of insight from my own experiences. I will start with a program from seven or eight years ago where I was fortunate to be the Manager of the Lunar Prospector Mission. In December 1997, just days before the launch, we had to make some very tough assessments of the risk. There was a single-string spacecraft, first use of a new launch pad, the maiden flight of a new

launch vehicle, although it was a design based on some proven fleet ballistic missile motors. There was a very tight budget schedule, and a relatively young team, although with some key experienced people at the top. So, why did we go for launch? Why did we accept that risk? Well, a strong test program, solid teaming with effective communication and some very experienced key managers, open channels during the design and development process, and lots of insight from a grey-beard committee that provided us with truly effective comments. In the end, it amounted to a considerable degree of trust and the determination that we had done everything possible to ensure mission success. So, we launched. That mission was successful, and that data is now being used as we plan a return to the moon in the not-too-distant future.

Another example is from the restructuring of the Mars program. In April and June 2000, we had to decide whether to take the risk of going back to Mars and that opportunity that was just 38 months away. Would we not only send an orbiter, but would we send a lander? So we had three opportunities there: do nothing, send an orbiter, send a lander. Why did we take the risk of doing the most ambitious one? Well, it was an outstanding launch opportunity. We had solid heritage from the Pathfinder Mission. We had a fully developed payload, and we had a robust entry, descent and landing scheme that was well understood. We put two rovers into the mission to balance the risk against random failures, and I think, as you will hear later on in this meeting from Steve Squyres, it had an unanticipated benefit of providing a rich panoply of hardware from which to reduce other types

of risks. But, in the end, the reason we took that risk was because it was the right thing to do. A strategic plan brought us back to the surface of Mars and gained the kind of information that is now changing the textbooks, changing the way that we look at the Red Planet.

Finally, let's look at the issue of human space flight risk. I was honored to be the sole NASA representative on the Columbia Accident Investigation Board. It was one of the most difficult assignments that I have ever had in my career. In that entire seven months, we never lost sight once of the nine lives that were lost, the seven astronauts and the two searchers, the two helicopter pilots. Clearly, we take substantial risk when we put humans on the top of a rocket and leave Earth's gravity well. How do we adequately mitigate that risk? From Columbia, we learned some tough lessons. We learned we need to develop a culture of safety for the long haul. We need clear communication, clear organization, adequate resources, rigorous and sound engineering principles, and a program systems engineering approach that addresses the entire effort, that addresses all the analysis that we need. We also need to effectively learn to encourage alternative points of view.

If we do all of these things, can we eliminate risk, especially for human space flight? I think not. Will we find a balance of well-mitigated risk and a powerful level of acceptable risk? I for one think so. What will that balance be? That's what we have come together to discuss today. Thank you.

[Applause]

It is now my pleasure to introduce the man whose idea this Risk Colloquium was, former Secretary of the Navy, former Deputy of the Office of Management and Budget, the man that many of us here in the room have been privileged for years now to call "The Boss," the Administrator of the National Aeronautics and Space Administration, the Honorable Sean O'Keefe. Sean . . .

[Applause]

Sean O'Keefe: Thank you, Scott. I want to thank the Naval Postgraduate School and all our friends here for hosting the conference. Admiral Patrick Dunne and his staff here have been most gracious in accommodating us in pulling together this very ambitious endeavor, and an awful lot of folks who worked very hard to pull it together. [Bob Jacobson] and the Public Affairs team have just done a masterful job, I think, of easing the process here of pulling together what is arguably one of the most eclectic collections of people. I think that last night our discussions at the reception were testimonial to where this is off to a tremendous start. It is an honor to be in the presence of so many remarkable aquanauts, mountain climbers, cave spelunkers, astronauts, and a couple of people fall into all of those categories: [John Grunsfeld] and [Mike Full] come to mind as fitting every one of those squares as extraordinary people who have experienced the full depth and breadth of some of the exploration opportunities. And, indeed, there are so

many here, I think, who make up an extraordinary collection of folks that could arguably be referred to as the League of Extraordinary Explorers.

There is no historic analogue, I don't think, to a gathering like this. Certainly no records exist of people living in Lisbon 500 years ago attending a candlelight symposium featuring Amerigo Vespucci or Vasco da Gama or Ferdinand Magellan. So, this is an opportunity given to modern technology and the ease of transportation that Scott referred to as a means to pull together this really extraordinary group, I think, of folks who've experienced the full extent and breadth of exploration and the risks attendant thereto. I want to particularly thank the folks -- thank you very much for attributing the idea of this to me, Scott, but quite the contrary: this was something to which I was persuaded by far superior intellectual logic as to why such a gathering was important for the purpose of parsing this larger question of risk and return of the exploration ventures we are about. In that regard, I am particularly grateful to John Grunsfeld, who has really provided the intellectual horsepower behind this kind of an effort to think about these questions in a structured way, and to [Keith Cowing], two very disparate kinds of folks but folks who share the passion and desire for exploration and an understanding, I think, of the attendant risk to it. So, to Keith and to John, I am most grateful for that extraordinary nudge that you all provided in pulling this together and the structure upon how we've done this.

We are gathered here, I think appropriately in a place like Monterey, at the edge of a great ocean, to discuss exploration in all of its facets: of extreme environments here on earth and in space. Indeed, this historic location is testimonial in so many ways and steeped in a history of exploration in an era gone past. The ventures that it took of so many people to explore and to establish a site of civilization that we see in this marvelous area here around Monterey is testimonial to that. Indeed, that which we enjoy each day in this community and understand of the full breadth of the aspects of exploration and its benefits are here and evident each day. Certainly this evening we will have an opportunity to see that more specifically at the aquarium, I'm sure.

I want to provoke some thought and reflection about a central question which is what we're about discussing here in these two-and-a-half days. Why do we take such risks to explore? As humans, what is it about us that really wants to understand that which is on the other side of the horizon? That which is on the other side of the ridge? In doing so, there are periods of our human history in which the acceptance of those risks have resulted in great gains and, in other cases, a mere footnote because it ended in a way that was less than fulfilling. In each case, there was always a contribution to that human desire to want to know and understand. How we assess those risks and deal with the challenges of exploration is the central question we are about in this two-and-a-half days, and I am most grateful to all of you for accepting the invitation to participate in this kind of debate and

discussion of how we may structure this question, not only in a public but also in a specific way.

I am certain we will have a lively discussion of where you draw the line between the benefits of exploration and the inherent risks, especially as technology changes and as we learn more about the environments in which we explore. Now, this is in part about NASA participation, to be sure, but it is mostly about those of us from NASA to have the opportunity to learn from so many others who are engaged in the broader exploration agenda of the central questions we pose. Several folks here from NASA, certainly astronauts spanning -- I am most grateful to see the Apollo Shuttle and Space Station veterans who have gathered here with us to share their thoughts. Indeed, I think that will be historic in and of itself -- to learn so much from them. All of them have dared to sit in a spaceship at one point, and in several cases, like in the case of Jerry Ross, seven different times. To sit on the top of the spaceship with the millions of pounds of explosive fuel, prepared to put their lives on the line in order to advance that cause of exploration and discovery. Now, I asked Jerry why you do this, and he said, "Well, because it's an opportunity to do so," and he would easily sign up for an eighth flight this afternoon, I'm sure. As a matter of fact, I don't think he would wait until noon to sign up as an opportunity.

To some, it may seem that NASA has made space travel routine, though. Let there be no mistake: I think we all fully appreciate and understand that space flight and exploration is still a very risky proposition. It is something that, despite our efforts to eliminate that

risk, there will be no means by which to accomplish that. There will always be an attendant risk to such a venture. And as a result, here, also, are NASA scientists, engineers, and managers, whose job it is to have constant vigilance about that risk. And in that regard, I view myself as included in that requirement for constant diligence to assure that risk is mitigated as much as we can. From the discussions that will take place here, I hope we will gain a greater appreciation of our responsibility as a public organization to take on bold and risky ventures and to learn from those who have accepted private ventures and other approaches to how we explore risk. How we may take that, frame that discussion and debate, and evaluate that risk in a different way.

But again, it was also a requirement that we do that in a diligent manner that minimizes and mitigates to the maximum extent we can what that risk may be, but that we understand what it is as much as possible and in some cases, accept it relative to the returns we think are feasible. That's the price of admission of what we do each and every time we're engaged in any exploration venture, be it of human space flight or robotic probes. It is always measured in the public domain and in the public eye relative to what our expectations are to that return. Indeed, NASA is an agency that has been defined over the course of its forty-six years by great, great triumph and unbelievably deep tragedy, and we've learned from both ends of that spectrum. It's a consistent set of themes. It is, indeed, the singular aspect of what has described this agency throughout the course of its four decades.

We have purposely, again, expanded the list of invitees, and again, we are very, very grateful to the folks who have accepted to do so and be a part of this, to gain an added perspective the people engaged in exploration of the Earth's most extreme environments can bring to the question of why explore in the face of danger. What is it about that act of exploration that makes it so appealing? And so important? And so much of an acceptance of human desire to want to understand and know that which we don't? Within the NASA family, we have great respect for all who put their lives on the line: Not just to seek thrills, but rather to gain knowledge, wisdom, and experience that will benefit all humanity. All of those assembled here have a unique and exciting story to tell about what drives us to explore, whether engaged in it directly or specifically involved in supporting its effort, all with the same objective. All of those stories, I have no doubt, if last night was any indication, we'll hear most of them, if not all. Also, we'll learn from the experiences of how folks work to minimize and mitigate the risk and learn where the fine line is between responsible and imprudent risk. Where is the differentiating line that marks that? Even when we've applied a careful calculus to these kinds of circumstances, in many cases and in many circumstances, the events of nature will provide a set of risks that must be responded to, and challenges independent of whatever control we might have over it. In some cases, it's next to none.

Our colleagues at the Kennedy Space Center right now after, now, their second hurricane in the span of a few weeks, are dealing with just that set of challenges; of risks that they are working through. And

because of their extraordinary diligence, having survived two unbelievable events of what are natural disasters in their own right, nonetheless have survived those experiences with all the shuttle orbiters intact, all the space station hardware in great condition, and no loss of life, no injuries. It's an extraordinary testimonial to the amazing diligence of Jim Kennedy, the director of the Kennedy Space Center, and the Kennedy team have done to ride out this set of natural disasters. I was down at the Kennedy Space Center with Bill Reedy a week ago and the poetic kind of discrimination with which nature provides us a set of challenges on risk were evident to us. I got an opportunity to see the vertical assembly building, which was the dominant structure on the skyline of the Kennedy Space Center that all recognize, and you could literally tell -- literally -- which way the wind was blowing when Hurricane Frances blew in. Three of the four sides of the vertical assembly building were relatively good shape. One side of it, better than a thousand panels off the side of it were blown off. Several of those panels have also departed as a result of the latest hurricane that just came through. As a consequence of striking some of the buildings of the area, ripping off big chunks of roof, all manner of consequence and destruction that occurred as a result of that, all of which mitigated in some way, shape or form. And yet, the irony is that right next to the thermal protection building, where a portion of the roof blew off next to the vertical assembly building, was the irony of a pressure-treated lumber gazebo without a scratch. Nary a hint.

Nature discriminates very profoundly, and why it does, we don't understand. It certainly is a case that reminds all of us, even in such a

simple, little example as that one, that despite our best efforts, there are unknowns that will always rise up in any of these circumstances, in any case of exploration, to be sure, for which the only defense we have is diligence and the hope that we have mitigated against it as well as we can.

We're living in an era of great potential, one in which the exploration of the solar system and of the Earth's most extreme environments will boost the opportunities we have to become a smarter, safer, healthier, and more intelligent world. Certainly we're more informed about the neighborhood we live in, a neighborhood defined as this little, bitty solar system around this little, puny star, in a gigantic galaxy that is part of a massive universe. We are just on the cusp of understanding what our role is in that broader case, and it's only been in the last forty years that we have come to understand it in ways that are really quite profound. I'm confident that if we do this right, we'll be amazed by the rapid pace of progress our future exploration activities will bring about.

But we also know from history about the consequences of forsaking exploration when we evaluate and determine as individuals, groups of people, or collections of people and nations, that when we elect to forsake those exploration opportunities, it has consequences. In the fifteenth century, China had the opportunity to be the world's foremost maritime power and indeed, possessed that capability. The Chinese ruling class, nonetheless, decided that the sponsorship of the fleet was an indulgence. History in the course of that several centuries thereafter

are certainly a part of how the rich culture was formed and those choices that were made.

Certainly, we have the same opportunity in this country to make similar kinds of choices. When in the 1875 time frame the director of the Patent Office advised the President of the United States that it was a good time to close down the Patent Office because everything that needed to be invented had been. Had that wizened sage's advice been accepted by the President of the United States at the time, imagine where we'd be! Yet nonetheless, that was based on a calculated understanding of what folks thought was the potential of understanding. It wasn't reached whimsically, it was reached by those who really believed that we had already incurred an enormous evolution of change of technology, revolution in industrial affairs, and as a consequence, we were on a roll, and anything beyond that was going to be, simply, derivatives of the same. In the last century, we've seen an explosion of growth in the exploration of seas, remote regions of the Earth, and, indeed, space. All of which, arguably, might not have happened had that original set of recommendations been followed.

It is no accident that NASA's founding occurred some forty-six years ago this very week, in the same decade that Edmund Hillary and Tenzing Norgay first stood on our planet's highest peak and that Jacques Cousteau used the good ship Calypso to conduct his epic voyages of undersea exploration. As explorers, we all share that common bond. We dare to dream grand dreams, and in the process of

doing so assume tremendous risks -- some of it beyond the scope of our knowledge of the time in which they're assumed and accepted. We do so for what we know to be great purposes. We also, in the depths of those tragedies that occur, grieve when our brethren are lost in the cause of exploration. And indeed, this conference -- this symposium -- and the impetus for it was brought about in debates that occurred in the aftermath of the Columbia tragedy.

It was a tough report that the Columbia Accident Investigation Board released. It told us an awful lot about the technical problems that led to it, the engineering challenges that we did not understand and as a result paid an ultimate price with nine people, as Scott points out -- the seven members of the crew as well as two engaged in the recovery of Columbia after its destruction. We learned that that is a horrendous price -- again.

But it also brought about, as a consequence of debate, a discussion about how we participated and we led, we contributed, to that tragedy - - and a broader public debate about a renewal of the purpose of why we explore. And that debate has gone on in a broader public policy sense and certainly an understanding that was best described and best captured by the video that we began this conference with. This is the direction we're about. The year after that horrific tragedy, it nonetheless was an impetus for motivating a debate by answering the fundamental question of why we explore and for what purpose and to what gain and what that strategy and path ahead should be in pursuit of that human desire to understand.

Well, in the process it also raised a series of questions that we have the opportunity here, I think over this couple of days, to at least debate how they should be framed. We have, I think, as a consequence of the strategies the President has levied and the direction that he has provided to us at NASA for exploration, a better understanding now of exactly how to pursue those exploration goals. And it's laid out in a series of objectives and programs to achieve it and a stepping stone approach and a whole range of different ways in which we're going to achieve that task.

But communicating the why of this venture has just begun as a public debate, just in the last few months. Again, this is an extraordinary moment in time in which there has been a renewal of that spirit of discovery, of exploration. In part it must then engage in this broader public dialogue because we are, after all, a public organization for which there is trust that is rendered to us by the public for our acceptance of these kinds of challenges. And that trust is fragile, and at each of the intervals in which we have seen either those great triumphs or great tragedies it has been tested.

So understanding the why and being able to communicate that in a way that's effective -- of why we accept the risks and what we have done to effectively demonstrate that we understand what those risks are and have mitigated them as much as we believe is feasible or to the extent that we've accepted them, that we understand why we've accepted those risks -- is part of what this discussion is all about.

So really communicating the why is part of what this venture in this couple of days is about here. And while participating in the panel discussions I would ask that each of us pose the following kinds of questions: how do we integrate the risk calculation with the benefits to be derived? What's the return? How do we communicate that as well? Because it's apparent when tragedies occur what the depth of the risk was that was accepted and then therefore not responded to effectively. But understanding what the benefits were to be derived sometimes gets lost in the translation, so how do we integrate that better? And that's on a personal as well as a societal level. There are any number of colleagues here and those who've elected and chosen to participate in this venture who can articulate this on a personal level. But also how we translate that in a broader societal context I think is very important, why we've accepted those risks for what potential gain.

Also ask the question: how do we regularly remind ourselves of the risk and is that really important? Is it something we really need to focus on and to what level of depth and degree? Certainly being accepting of it or dismissive of it is not one of the options, but what is the appropriate balance? What's the point at which we become I think [unintelligible] knowledgeable and witting of what that risk is for what gain, but at what stage do we declare that is either far and excessive of what is potentially the benefit or for which that is an accepted risk for which we have worked our way through rationally and logically?

Also pose the question: how do we avoid complacency? It is human nature, it is part of our human makeup -- all of us -- that that which we see repetitively we begin to accept as normal. If you've never seen it before it suddenly becomes a remarkable circumstance, something which you respond to because you've never seen it before. And yet it may be far less significant than that which you see every single day as risk, yet because we see it so regularly we accept it. What is it about -- a chat I had with a couple of folks last night -- our view as a culture, as a society, of why it is understood that there is a risk attended to driving an automobile, flying in a commercial airplane? These are things we take and understand as being part of that, either intuitively or intellectually, and have recognized that despite the fact that lots and lots of folks every single year die in horrific automobile accidents we accept that as humans because of the transportation and opportunities it provides -- the facilitation of discourse and communication between and among each other and the means to get from here to there. What is it about it that makes that an accepted level of risk? And yet in the act of exploration when the tragedies occur what is it about that that makes that either intolerable or why we question it? And again, the root of this may yet well be, I believe, to be grounded in how understood the benefit is that we think we gained as a consequence of the activity and the effect of accepting that risk.

Also, for those who are involved in wider-ranging sets of exploration opportunities, what is it about the risk that you accept that's different than that which NASA accepts in what we do and, of course, that

which is similar? How do you parse between both and determine what we can learn from this about that?

And I guess the ultimate question: what can we learn from each other by how to frame this question differently and, indeed, communicate it more effectively as an opportunity for great gain? Over the course of human history every major advance has occurred because of the temerity on the part of human beings to want to understand and to explore and to do something that has not been tried or has been tried so irregularly as to have no pattern to it. If you think of every major advance in the course of our existence it has been attributed to that attribute, that characteristic of us as human beings.

This week we have an opportunity, I think, to learn from each other's experience so that we can forward boldly into the unknown, informed by a responsible sense of how we communicate that in a way that conveys the reasons why it is or is not accepted as an appropriate level of risk. We are resolved at NASA to better communicate with the public about why it's necessary to take those risks or why it is inherent in the way we as human beings conduct our lives that would give meaning as well as purpose to this larger exploration agenda -- and knowing at its core that it's best summarized by a comment President Bush made in Houston just days after the Columbia tragedy, that this cause of exploration is not an option we choose. It's a desire written in the human heart. And when we can confront that even on both ends of the equation -- in its great triumph as well as in its depths of tragedy -- and we're reminded why we're driven to this, what is it we can do

responsibly as public servants, for those of us at NASA, and I think as the broader range of community represented here of explorers to communicate that more effectively?

I thank you all for your participation and I look forward to sharing with all of you the spirit of exploration and discovery that I think is certainly evident in this group by so many people who have elected to spend their time to engage in these important questions. The manner in which we have, hopefully, framed this over these couple of days will bring those kinds of questions to bear in ways that as we move forward in this next step of exploration, to return to flight, to complete the International Space Station, to develop through Project Constellation an opportunity to explore beyond Earth's orbit, all of this may be the beginnings again of an opportunity to frame that discussion and debate, not only among ourselves, but in the broader public in ways that highlight those purposes of exploration and why we engage in the risks and accept them, knowingly, for the purposes for which NASA began.

I thank you all for your willingness to participate in that discussion. And if last night's discussion and this morning's debate before we began is any indication, it promises to be a very exciting opportunity. I thank you all very much for coming. I appreciate it.

Moderator: Thank you very much, Mr. Administrator. At this time, for everyone who came in late, you're in the Penalty Box, so you're going to have to remain in your seats. The rest of you, we're going to take about a

ten or fifteen minute break and give you an opportunity to get coffee or a Danish or use the facilities. If you would, please, be back in your seats at twenty after the hour. That gives us about fifteen minutes.

[Break]

Moderator: Welcome back. We're getting started just a little late, and I'm going to fault the next moderator. He was over at the hotel still asleep. And he does this quite often, as I understand it, from the anchor desk at CNN.

[Laughter]

We want to continue this discussion with a look at the public's perception of risk. And the moderator of this program is intimately involved in sharing both the tragedies and triumphs of exploration with the world. If there is a compelling story of exploration and discovery, CNN's Miles O'Brien usually isn't too far away. He has shared the anchor desk with broadcast pioneers and one of my heroes, Walter Cronkite. He's covered John Glenn's historic return to space. And he's covered many aspects of space exploration, both human and robotic. As an instrument-rated aviator, Miles brings first-hand experience and expertise to his craft. Please join me in welcoming CNN journalist Miles "Late" O'Brien.

[Applause]

Miles O'Brien: You know, that sleeping at the anchor desk, that's true. Try covering a hurricane, three of them, six hour stretches, and come up with adjectives to describe it. Deep, deep, deep into the [unintelligible] you go. But it's a living.

It is a great pleasure to be here to kickoff this conference. Before I get to our esteemed panelists over there, they're great men with deep thoughts. They've got great books. I've got neither. I'm just a regular guy. I'm not a rocket scientist -- I play one on TV.

You talk about risk—NASA's decision to put me here in this spot, a history major, cobbled together two-minute TV pieces, good enough for cable, actually basic cable. It's a sure sign NASA is not risk averse, right?

We're here to talk about the public's perception of risk, but first let me give you my perception of the public. The public is—well, how do we say this delicately?—the public is like a 12-year old: attention span of a gnat, illogical, scatological, ill informed, hyperactive, obstinate, and more interested in entertainment than in true enlightenment, which after all is like homework or something.

Now how do I know this? Well, why would so many people be watching this man?

[Laughter]

Now let me be clear. The CNN audience is much smarter, more sophisticated, better informed—well, think of this as the CNN audience.

[Laughter]

Now how do I know the audience so well? Well, given the ratings lately, I know our audience, each and every one of them, on a first-name basis. There they are.

But this 12-year-old thing, work with me on that for just a moment, because I think it does represent an opportunity for those who care about the exploration of space, as I do, believe it or not. 12-year-olds are risk takers. They are fearless and will often do some very stupid, ill-conceived things. And so it goes with the public.

How do I know this? Well, you've been watching TV lately. Fear Factor, right? Survivor. Jackass. Whatever they are, people will take risks, they'll cavort naked on desert islands, they'll stand up to Donald Trump, they'll drink a [rosen] smoothie, so long they think there is a potentially something in it for them.

Which brings me to a set of rules that I call O'Brien's Sacred Canon of Underlying Risk Estimation for Newsmen Engaged in Space Stories. I'm sorry, this is a NASA crowd, right? I have an acronym for it. OBSCURENESS. You guys like those acronym jokes, don't you?

All right, OBSCURENESS Rule #1 is this: the public is not as wimpy as we may think so long as they understand and accept the risk-to-reward equation and then decide it is worth the cost. So far the war on terror and even the war on Iraq is passing muster on this test. Of course that's what the pollsters are telling us. We'll know for sure in six weeks.

So where do we get this notion that the public is afraid of taking risks? Where does all the whining come from? Well, there is Congress of course, and I could digress on that one, but dealing with Congress is your specialty here, so core competency in that, so I'll leave that to the experts.

[Laughter]

But where else I ask do you find whiners? The media. We are a bunch of whiners. The media is risk averse but then again we're everything else averse as well. Kind of the nature of the beast for a whole host of reasons. Newsrooms attract observers, chroniclers, malcontents, and chronic complainers. We are as a group professional skeptics. We are often outright cynics. We look at people, ideas, philosophies, problems, catastrophes, and calamities, and by nature and training and years of practice, we reflexively look for the chink in the armor, the flaws in the logic, the mistakes, the malfeasance, the masquerades and the manipulators. It's a living, okay?

Now don't get me wrong, I'm not trying to rain on my own parade here. It is an important job, I do believe that, in a Darwinian-Huxleyesque way. We play a role in our democracy. It's sort of a natural selection of all that is good and true—or so we like to think.

Now does that mean we're always right? Well, the media is always accurate, except when it isn't. We've refined this rule, it's now called the Dan Rather Rule.

[Laughter]

Now I have some documents to back this claim up. I'm not sharing them with you until we have our expert team of bloggers verify their authenticity.

In any case, there is a long list of stories we could talk about where the media has whipped up a frenzy of concern about something that statistically really wasn't that big a deal after all. Think of the so-called killers that have been local news, ratings sweep fare. Alar on the apples, radon in the ground, mold in your basement, shark attacks on the beach, the nuclear power plant down the street. And as we say in the newsroom, never let the facts get in the way of a good story.

Seriously, though, this goes right to the heart of what we do for a living. People always say to me, why do you focus on shark attacks or murders or Kobe Bryant when there are so many other pressing issues that affect so many people? And I say to them, the news business is

about what is news, by definition, then, deaths due to smoking or accidents on the highway, while a terrible scourge in this country, are less newsworthy, because sadly they are commonplace, they are routine. What does Diane [Fawn] call it? The normalization of deviance. I think I saw an example of that last night on pay-per-view in the hotel, as a matter of fact.

[Laughter]

Try to get that through the expense report somehow.

[Laughter]

Seriously, if statistical risks were our guide, we would air twenty seven and a half minutes of stories on the hazards of smoking for every one second devoted to plane crashes. Twenty seven and a half minutes on the hazards of smoking, given the number of deaths to smoking, versus one second devoted to plane crashes. If you hear that sound in the distance, that's the noise of a million remotes clicking over to Fox when we do that twenty seven and a half minutes.

Which brings me to Rule #4: There are statistics, damn statistics, and then there are stories. With rare exceptions, news stories that deal with some sort of risky endeavor don't put that risk in any sort of context. Time is short, although for the life of me in a 24-hour network I never have understood that, why time is short. But most stories you get this emotional yin and yang. You have a lead that goes something like

this: Some experts say that the Space Shuttle is a bucket of bolts that needs to be retired. Others disagree. Back and forth it goes for a few minutes, and then it's, what's Scott Petersen up to anyway, you know?

It is after all a business, and we are reporting against a tide of short attention spans attached to twitchy thumbs on those cursed remote controls. Now this really isn't news. While most of us didn't have remotes in April of 1970 when Apollo XIII was headed toward the moon, the man in the audience here in command, the country had already become blasé about such epic voyages.

Imagine that—a trip to the lunar surface and we are blasé. When CBS broke into regularly scheduled programming with a bulletin indicating there was trouble on the spacecraft, and the crew was in great peril, stations were flooded with calls from angry viewers. Put the show back on, they demanded. The show incidentally was, *Lost in Space*.

[Laughter]

Can't make this up, folks. Truth was stranger than fiction that night. And people chose fiction. Now if NASA had been listening closely at that moment, they would have heard the unmistakable catch phrase of the robot, "Danger, Will Robinson, danger." Big trouble above and beyond the urgent crisis facing Lovell and crew was brewing.

Which brings me to OBSCURENESS Rule #5: There are three things that motivate people—fear, greed and curiosity. The space race was

built, bought and paid for on the basis of fear. If we don't get to the moon in a hurry, God forbid there might be a hammer and sickle planted in the green cheese, a red moon rising...That would be a bad moon rising for sure. The problem was NASA, an agency that prides itself on redundancies for its redundancies, didn't have a motivational back up plan. They were too busy trying to win that race. So with fear out, well what about greed? Well, no way to make money on the moon that we know of. Curiosity? Well, the scientists were curious about those rocks but they really weren't enough to capture the imagination of the public. They had Jack Smith's imagination for sure. No question about that. But the public was not engaged in that. It was just a matter of time before it would be last call for NASA's Apollo program and Nixon of course, turned the clock back by cancelling the final Apollo missions leaving NASA with some world class lawn ornaments.

Could have been salvaged if people had become more fascinated by the adventure? You know they are curious enough if the destination is intriguing and, and so is the journey. I think what we've seen with the Mars exploration Rovers this year, the interest in the red planet. People are captivated by other worlds. It spurs their imagination and the concept of an adventuresome journey to such a place does engage their curiosity, one of those motivators.

And this brings me to my next bit of OBSCURENESS - - minimize the risk and you minimize the interest. Everybody inside NASA knows the real risks by rote. You're comfortable managing risk. It is what you do. That is what the space business is all about. Purposefully or

not, the message that comes across when astronauts and engineers talk about what they do with the rest of us is matter of fact. It sounds like just another day at the office for NASA. It is for you guys but it is a long way from most peoples' Dilbert lives. Perhaps NASA is worried too about giving Congress cold feet or that whining media and thus potentially losing all the marbles, but in the end it is counterproductive because it takes the adventure out of the ultimate adventure.

Now NASA is hoping for even greater adventures in the future and the risk will rise commensurately. But if it is an adventure with a clear goal and there are some honest talk about the risks and the rewards, I predict the American people will be there cheering for you. You still might have to hold Congress' hand and the media will probably still whine but the people will be there invested in that risk, rooting for the reward. Which brings me to my final OBSCURENESS rule: I will do everything to help you so long as I get to go.

[laughter]

Alright that was just hopefully to engage you in some thoughts. We'd like to take your questions a little bit later. I'm going to turn it over now to the next person on the panel this morning.